REMARKS

Reconsideration and allowance of this application are respectfully requested. By this Amendment, claims 1, 6 are amended and claims 11-12 are newly added. Support for the amendments and newly added claims can be found, at least, in the figures and from page 9, line 14 to page 30, line 20 in the specification. Claims 2-5, 7-10, the specification and drawings are amended. No new matter is introduced by this Amendment.

Drawings

In the Office Action, Figures 1 and 2 are objected. Attached hereto are substitute sheets for Figures 1 and 2 on which these figures are designated by a legend --Related Art--. Thus, the objection should respectfully be withdrawn.

Information Disclosure Statement

The Office Action notes the document cited on page 4 of the specification. The Information Disclosure Statement filed on November 26, 2003 lists this document. Attached hereto is an Information Disclosure Statement listing the document disclosed on page 10 of the specification.

Specification

In the Office Action, the title of the invention was said not being descriptive. In this Amendment, the title of the invention is amended without prejudice or disclaimer.

In the Office Action, the disclosure was objected to because of informalities. In this Amendment, the disclosure are amended without prejudice or disclaimer. Thus, this objection should respectfully be withdrawn.

Claim Objections

In the Office Action, claims 1, 4-6, 9 and 10 were objected to because of informalities. Claims 1, 4-6, 9 and 10 are amended without prejudice or disclaimer. Thus, this objection should respectfully be withdrawn.

Claim Rejections – 35 U.S.C. § 112

In the Office Action, claims 3 and 8 were rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Office Action stated that the recitation "the control amount" is without sufficient antecedent basis. In this Amendment, claims 3 and 8 are amended without prejudice or disclaimer. Thus, these rejections should respectfully be withdrawn.

Claim Rejections – 35 U.S.C. § 102(b)

In the Office Action, claims 1-4 and 6-9 were rejected under 35 U.S.C. § 102(b) as being anticipated by US 5,641,156 to Nakuda (Correctly "Nukada") et al. (hereinafter called "Nukada"). The Applicant respectfully submits that the Office Action fails to show that all of the claimed limitations are disclosed by the prior art.

In relation to a calculation section, the Office Action states that Nukada teaches a calculation section of the control configured to obtain a control amount of a rotational phase indicating columns 7 and 8 in Nukada.

However, column 7 of Nukada states as follows:

"Photoelectric sensors for inspecting a passage of the sheet material 10 are provided in several positions on the conveying path 20. The photoelectric sensors are employed for checking take-out of the sheet material 10, confirming the passage of the sheet material on the conveying path and checking an insertion thereof into the accumulating unit 4 and calculating

a pitch of the sheet materials. Herein, the sheet material pitch implies an interval between the leading or trailing edges of the sheet materials fed adjacent to each other. Further, the photoelectric sensor is capable of detecting abnormalities (abnormalities in sheet material length and in sheet material pitch) in the sheet materials 10 on the conveying path 20. Particularly, photoelectric sensor 51a and 51b disposed just behind the take-up roller 11 serve to calculate the sheet material pitch immediately after taking out the sheet materials 10. The photoelectric sensors 51a and 51b calculate the sheet material pitch, and, if an abnormal pitch is caused, the system quickly detects this abnormality and takes a proper measure."

Also, column 8 of Nukada states as follows:

"FIG. 9 is a timing chart showing how the sheet material pitch is detected. The detection of the sheet material pitch involves the use of a timer, wherein a signal of the photoelectric sensors 51A and 51B shown in FIG. 4 serves as a trigger. When the leading or trailing edge of the sheet material traverses between the photoelectric sensors 51A and 51B, sensor outputs change from an H-level to an L-level. However, this signal serves as the trigger, and a timer signal may be taken in. An i-th sheet material pitch P.sub.i is a time difference between a timer value T.sub.i taken at an i-th time by the detecting unit and a timer value T.sub.i+1 taken at an (i+1)th time. The sheet material pitches P.sub.i are stored sequentially in the memory.

FIG. 10 schematically illustrates a construction of the accumulating unit. The accumulation impeller 41 is rotationally driven by a stepping motor 42. A rotary encoder 43 is belt-connected to the motor shaft and works to monitor a rotational position of the accumulation impeller 41, and an encoder output thereof is supplied to the control unit (not shown)." (Column 8, Lines 4-24).

"An insertion detecting sensor 45 is disposed on the circumference of the accumulation impeller 41. This insertion detecting sensor 45 is constructed of a light emitting element and a light receiving element, and its output changes when the sheet material passes

by. The insertion of the sheet material into the accumulation impeller 41 can be recognized by placing the insertion detecting sensor 45 to traverse the conveying path slightly in front of a point at which the sheet material reaches an entrance of the accumulation impeller 41, i.e., an intersection between the conveying path and a line of outer shape of the accumulation impeller 41. An insertion position of the sheet material at a groove entrance of the accumulation impeller 41 can be detected by reading a value of the rotary encoder 43, wherein the output of this insertion detecting sensor 45 serves as a trigger. Items of data about the insertion position and the rotating speed of the accumulation impeller are fed back to the control system. Then, a control characteristic can be also improved by changing a weighing coefficient of an evaluation function which will be stated later." (Column 8, Line 61 – Column 9, Line 13).

As in the above descriptions, Nukada discloses the photoelectric sensors 51a, 51b and an insertion detecting sensor 45. Also, Nukada discloses that the photoelectric sensors 51a and 51b calculate the sheet material pitch. Further, Nukada discloses that the accumulation impeller 41 is controlled based on the detection result of an insertion detecting sensor 45. However, Nukada is different from the present invention at least in the use of the respective detection results of the sensors. Nukada does not disclose the following limitations recited in claim 1 and 6.

Claim 1 recites, "a first calculation section configured to calculate a sheet feeding speed of the feeding section based on detection results by the first and second detection sections and the distance between the first and second detection sections, and to calculate a time required for a sheet reaching the vaned wheel from the first detection section based on the sheet feeding speed and the distance between the vaned wheel and the first detection section;

a second calculation section configured to obtain a control amount of a rotation phase of said vaned wheel necessary to put a sheet between the blades of the vaned wheel from the time calculated by the first calculation section."

Claim 6 recites, "a first calculation section configured to calculate a sheet feeding speed of the feeding section based on detection results by the first and second detection sections and the distance between the first and second detection sections, and to calculate each time required for a sheet reaching each of the vaned wheels from the first detection section based on the sheet feeding speed and each distance between each of the vaned wheels and the first detection section;

a second calculation section configured to obtain a control amount of a rotation phase of each of said vaned wheels necessary to put a sheet between the blades of each of the vaned wheels from each time calculated by the first calculation section."

Claims 2-4 depend from claim 1 and claims 7-9 depends from claim 6. Thus, these rejections should respectfully be withdrawn at least because the Office Action fails to show that Nukada discloses the above limitations.

Claim Rejections – 35 U.S.C. § 103(a)

In the Office Action, claims 5 and 10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nukada in light of JP 62-215459 (hereinafter "Sato").

To establish a prima facie case of obviousness, all of the claimed limitations must be taught or suggested by the prior art. The Applicant respectfully submits that the Office Action fails to show that the combination of Nukada and Sato discloses all of the claimed limitations.

Sato discloses that the skew of a bank bill is detected by a pair of sensors disposed immediately before an impeller wheel. As mentioned above, Nukada discloses the photoelectric sensors 51a, 51b and an insertion detecting sensor 45. Also, Nukada discloses

that the photoelectric sensors 51a and 51b calculate the sheet material pitch. Further, Nukada discloses that the accumulation impeller 41 is controlled based on the detection result of an insertion detecting sensor 45. However, Nukada is different from the present invention at least in the use of the respective detection results of the sensors. Sato is different from the present invention at least in the use of the detection result of the sensors. The combination of Nukada and Sato does not teach the use of the respective detection results of the sensors. The Office Action fails to show that the combination of Nukada and Sato discloses at least the following limitations recited in claim 1 or 6.

Claim 1 recites, "a first calculation section configured to calculate a sheet feeding speed of the feeding section based on detection results by the first and second detection sections and the distance between the first and second detection sections, and to calculate a time required for a sheet reaching the vaned wheel from the first detection section based on the sheet feeding speed and the distance between the vaned wheel and the first detection section;

a second calculation section configured to obtain a control amount of a rotation phase of said vaned wheel necessary to put a sheet between the blades of the vaned wheel from the time calculated by the first calculation section."

Claim 6 recites, "a first calculation section configured to calculate a sheet feeding speed of the feeding section based on detection results by the first and second detection sections and the distance between the first and second detection sections, and to calculate each time required for a sheet reaching each of the vaned wheels from the first detection section based on the sheet feeding speed and each distance between each of the vaned wheels and the first detection section;

a second calculation section configured to obtain a control amount of a rotation phase of each of said vaned wheels necessary to put a sheet between the blades of each of the vaned wheels from each time calculated by the first calculation section."

Claim 5 depends from claim 1 and claim 10 depends from claim 6. Thus, these rejections should respectfully withdrawn at least because the Office Action fails to show that the combination of Nukada and Sato discloses or suggests either of the above limitations.

Conclusion

All rejections and objections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,

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